



**Public Water Supply
Survival Guide
for the
Filter Backwash Recycling Rule**

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Table of Contents

<u>Topic</u>	<u>Page</u>
Overview	1
Acronyms and Definitions	2
1. Rule Summary and Compliance Timetable	4
2. Recycling Practices / Treatment Techniques	5
Appendix A. Composite Correction Program and Sanitary Surveys	7
Appendix B. Significant Deficiencies in a Sanitary Survey	9
Appendix C. EPA Quick Reference	12

An “Acronyms and Definitions” list is provided as an aid to using this guide.

Section 1 provides a summary of the Filter Backwash Recycling Rule and a timetable for compliance. Each requirement listed in the timetable is cross-referenced to the applicable state and federal rules, the applicable sections of this document, and the applicable references to EPA guidance manuals.

Section 2 describes the importance of proper recycling practices in the treatment process, which systems are to give a recycling practices report and how recycling practices are to be reported, and the requirements for reconfiguring recycling practices which are not currently in compliance with the Filter Backwash Recycling Rule. This section also discusses requirements regarding system recordkeeping and public notification.

Section 3 explains KDHE’s policies and procedures that will be used in meeting the reporting and recordkeeping requirements, and special primacy requirements, which will be observed by KDHE in implementing the Filter Backwash Recycling Rule. This section discusses specifics such as sanitary surveys, the comprehensive evaluation program, and evaluation of alternative data for inspection / evaluation purposes and approvals of alternative practices.

OVERVIEW

This guidance document is provided by the State of Kansas as a “quick reference guide” to assist Public Water Supply Systems in complying with the Filter Backwash Recycling Rule (FBRR) requirements contained in the Kansas Primary Drinking Water Regulations. It presents a summary of the applicable regulatory requirements associated with the IESWTR promulgated by the Environmental Protection Agency (EPA) on June 8, 2001 which has been primarily adopted by the Kansas Department of Health and Environment (KDHE). This guidance provides a summary of the applicable requirements and the dates by which the requirements must be met. It is a basic “what and when” summary for all public water systems. While all systems should feel comfortable using this document as a complete and accurate summary of IESWTR requirements, the applicable full legal language is contained in the Kansas Administrative Regulations in conjunction with the Code of Federal Regulation which KDHE has adopted by reference.

This survival guide applies to:

Systems: CWSs, NTNCWSs, TNCWSs

Sources: Surface Water and Groundwater Under the Direct Influence of Surface Water

Persons Served: All sizes

Treatment: Conventional or direct filtration systems which recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes

Specific questions regarding the information contained in this document, the Kansas Primary Drinking Water Regulations, or any other matters pertaining to drinking water and public water supply systems in Kansas should be directed to

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Topeka, Kansas 66612 - 1367
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Additional information and e-mail addresses can be obtained by accessing KDHE’s web site at:

www.kdhe.state.ks.us

With the exception of the KDHE policies described in Section 3, reference is made to EPA guidance documents for specific details. Full citations to EPA manuals are given at the end of this “Survival Guide”, along with shortened names by which these publications are identified whenever they are cited in this document. KDHE staff, public water supply system officials, and other interested parties can refer to these documents when examining the specific details of the Filter Backwash Recycling Rule. A handy EPA Quick Reference Guide on the Filter Backwash Recycling Rule is also provided at the end of this survival guide.

ACRONYMS

ACC - Alternative Compliance Criteria

BAT - Best Available Technology

CCP – Composite Correction Program

CFR - Code of Federal Regulations

CWS - Community Water System

D/DBPR - Disinfectants and Disinfection Byproducts Rule

DBPs - Disinfection Byproducts

DBPP - Disinfection Byproducts Precursor

DOC - Dissolved Organic Carbon

EPA - United States Environmental Protection Agency

FBRR – Filter Backwash Recycling Rule

GAC10 - Granular activated carbon adsorption with a 10 minute empty bed contact time

GWUDI - Ground Water Under the Direct Influence of Surface Water

HAA5s - Sum of five haloacetic acids (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, dibromoacetic acid)

KDHE - Kansas Department of Health and Environment

MCL - Maximum Contaminant Level

MCLG - Maximum Contaminant Level Goal

MDBP – Microbial and Disinfection Byproduct

mg/L - Milligrams per liter

MRDL - Maximum Residual Disinfectant Level (as mg/L)

NCWS - Non-Community Water System

NTNCWS - Non-Transient Non-Community Water System

PWS - Public Water System

SDWA - Safe Drinking Water Act

SOP - Standard Operating Procedure

SUVA - Specific Ultraviolet Absorbance

TNCWS - Transient Non-Community Water System

TOC - Total Organic Carbon

TTHMs - Total trihalomethanes (Sum of chloroform, bromoform, chlorodibromomethane, and bromodichloromethane)

DEFINITIONS

KDHE: The Kansas Department of Health and Environment is Kansas' primacy agency for the administration of the Safe Drinking Water Act. When the term "the State" is used in this survival guide, it refers to this agency.

EPA: The United States Environmental Protection Agency has federal oversight responsibility and authority regarding the administration and enforcement of the Safe Drinking Water Act. EPA prepares rules and technical / implementation guidance to implement the Safe Drinking Water Act through other agencies with primacy authority such as KDHE.

CCP: A Composite Correction Program is a structured approach to analyzing the performance of filtration and disinfection facilities. This activity is commonly carried out by a water system in cooperation with a third party consultant. The IESWTR requires water systems to undergo a CCP evaluation under specific circumstances. See Appendix A for a more detailed definition about CCPs and Sanitary Surveys.

GWUDI: Systems utilizing "groundwater under the direct influence of surface water" (as previously determined by KDHE) are required to treat water from these sources as specified under the Surface Water Treatment Rule.

IESWTR: The Interim Enhanced Surface Water Treatment Rule, promulgated by EPA on December 16, 1998, is a companion rule to the Stage 1 Disinfection and Disinfection Byproducts Rule and a precursor to the Long Term 1 Enhanced Surface Water Treatment Rule. The IESWTR established enhanced requirements for filtration of surface and GWUDI sources. These two rules have interrelated provisions; actions initiated under one rule have the potential to effect compliance under the companion rule.

M/DBP Rules: The term "M/DBP Rules" stands for "Microbial / Disinfection Byproduct Rules" and refers to the TCR, SWTR, IESWTR, LT1ESWTR, LT2ESWTR, Stage 1 DDBPR, Stage 2 DDBPR, FBRR, and GWR collectively.

Stage 1 DDBP Rule: The Stage 1 Disinfectants and Disinfection Byproducts Rule, promulgated by EPA on December 16, 1998, is a companion rule to the Interim Enhanced Surface Water Treatment Rule. The Stage 1 DDBP Rule established enhanced requirements on the monitoring and treatment of disinfectants and disinfection residuals in system distribution systems. These two rules have interrelated provisions; actions initiated under one rule have the potential to effect compliance under the companion rule.

SWTR: The Surface Water Treatment Rule, promulgated by EPA on June 29, 1989, was the precursor to enhanced requirements established under the Interim Enhanced Surface Water Treatment Rule and the Stage 1 Disinfectants and Disinfection Byproducts Rule. It established filtration and disinfection requirements that provide for continuous protection from pathological microbes potentially present in source waters.

TCR: The Total Coliform Rule, promulgated by EPA on June 29, 1989, was a precursor to enhanced requirements established under the Interim Enhanced Surface Water Treatment Rule and the Stage 1 Disinfectants and Disinfection Byproducts Rule. The TCR established health goals and legal limits for total coliform levels in drinking water (as indicator organisms), requires the conduct of routine sanitary surveys of systems, and specifies the type and frequency of testing which systems must perform.

1. Summary and Compliance Timetable

1. A. Water systems affected by this rule

This rule applies to all public water systems that use surface water or ground water under the direct influence of surface water as a source. Additionally, it applies only to systems that employ conventional or direct filtration and recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes. Systems that do not recycle these streams, or do not use conventional or direct filtration have no requirements under the Filter Backwash Recycling Rule (FBRR).

1. B. General Requirements

1. Systems that recycle any of the streams mentioned above must report to KDHE by December 8, 2003. This report must describe the recycled streams and indicate the point at which these streams enter the treatment process.
2. The FBRR imposes a treatment technique requirement that must be met by June 8, 2004: **systems that recycle waste streams must introduce these streams at the head of their treatment process or at another point approved by KDHE.** An extension of this date is possible if the system must undertake capital improvements in order to comply with the treatment technique.
3. Systems must keep a record of recycle flow information and make this available for review and evaluation by KDHE.

1. C. Implementation Timetable

The following table describes key FBRR implementation activities and compliance dates:

Date	Action Required	References
December 8, 2003	Systems must notify KDHE if they recycle spent filter backwash, thickener supernatant, or liquids from dewatering processes, and submit a plant schematic and other required flow data.	K.A.R. 28-15a-76 40 CFR 141.76(b) KDHE Survival Guide Sect. 2
June 8, 2004	Systems must recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes through the processes of a system's existing convention or direct filtration system or at an alternate location approved by KDHE, unless capital improvements are required to modify the recycling location to meet this requirement.	K.A.R. 28-15a-76 40 CFR 141.76(c) KDHE Survival Guide Sect. 2
June 8, 2004	Systems must collect and retain recycle flow information on file for review and evaluation by KDHE.	K.A.R. 28-15a-76 40 CFR 141.76(d) KDHE Survival Guide Sect. 2
June 8, 2006	Systems that need capital improvements to comply with the recycle return requirements must have capital improvements completed.	K.A.R. 28-15a-76 40 CFR 141.76(c) KDHE Survival Guide Sect. 2

2. Recycling Practices / Treatment Techniques

2. A. Introduction

Recycling of spent filter backwash water, thickener supernatant, or liquids from dewatering processes in a conventional or direct filtration treatment plant can impact the ability of the treatment process to achieve the required removal and inactivation of pathogens. These recycled streams may contain large concentrations of pathogens and other contaminants that were originally captured by the filters. The chemistry of these streams has previously been altered by passage through the treatment train and this can affect the performance of coagulation and sedimentation steps if the rate of recycling is not carefully controlled. The FBRR is designed to ensure that systems choosing to recycle these flows do so in a manner that prevents treatment failure. In general, this means that recycled flows must enter the treatment train at the head of the plant, so that the recycled water passes through the entire treatment process. The volume of recycled flow must be carefully controlled to prevent process upsets.

2. B. Reporting of Recycling Practices

All systems affected by this rule must report to KDHE by December 8, 2003 if they recycle spent filter backwash, thickener supernatant, or liquids from dewatering processes. The system must provide KDHE with a plant schematic showing the origin of all flows that are recycled, the hydraulic conveyance used to transport them, and the location where they are introduced back into the treatment plant. This report must also include data on the typical recycle flows, the highest observed plant flow experienced in the previous year, and design flow for the treatment plant, all in gallons per minute. If KDHE has previously approved an operating capacity for the treatment facility, this must also be reported.

The purpose of this report is to give KDHE an opportunity to evaluate recycling practices and to determine if these practices have the potential to impair the ability of the treatment process to consistently achieve compliance with the treatment technique requirements of surface water treatment rules.

Systems that do not recycle any of these flows are not required to report.

2. C. Treatment Technique Requirements

The FBRR requires systems to return any of the recycled flows mentioned above to the head of the treatment train, unless KDHE approves an alternative entry point. The process that KDHE will follow in determining whether an alternative entry point will be approved is discussed in Section 3 of this survival guide.

The system is expected to be in compliance with this requirement by June 8, 2004, unless capital improvements are needed to change the point of entry or other aspects of recycling practices. The compliance date for systems that must make capital improvements is June 8, 2006.

2. D. Recordkeeping requirements

Water systems subject to this rule must collect and retain the following records. These records must be made available for review and evaluation by KDHE beginning on June 8, 2004.

1. A copy of the recycle notification information submitted to KDHE (Section 2.B.).
2. A list of all recycle flows and the frequency with which they are returned to the treatment process.
3. Average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes.
4. Typical filter run length and a written summary of how the filter run length is determined.
5. The type of treatment provided for the recycle flow.
6. Data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used and average dose and frequency of use, and frequency at which solids are removed, if applicable.

2. E. Public Notification

Failure to comply with the treatment technique or reporting requirements of this rule is a violation of national primary drinking water regulations. The content and manner of this notification is specified in the Public Notification Rule.

APPENDIX A

Composite Correction Program and Sanitary Surveys

Definitions

Composite Correction Program: The Composite Correction Program (CCP) is a systematic approach to identifying opportunities for improving the performance of water treatment and implementing changes that will capitalize on these opportunities. The CCP consists of two (2) elements:

a. Comprehensive Performance Evaluation: The Comprehensive Performance Evaluation (CPE) is a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation, and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. The CPE must consist of at least the following components: a) assessment of plant performance; b) evaluation of major unit processes; c) identification and prioritization of performance limiting factors; d) assessment of the applicability of comprehensive technical assistance; and e) preparation of a CPE report.

b. Comprehensive Technical Assistance: Comprehensive Technical Assistance (CTA) is the implementation phase that is carried out if the CPE results indicate improved performance potential. During the CTA phase, the system must identify and systematically address plant-specific factors. The CTA consists of a) follow-up to the CPE results; b) implementation of process control priority setting techniques; and c) maintaining long term involvement to systematically train staff and administrators.

Sanitary Survey: A Sanitary Survey is an onsite review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water. The sanitary survey will include, but is not limited to, the following elements:

- a. Source
- b. Treatment
- c. Distribution system
- d. Finished water storage
- e. Pumps, pump facilities, and controls
- f. Monitoring and reporting and data verification
- g. System management and operation
- h. Operator compliance with state requirements.

Significant Deficiency. A Significant Deficiency is any defect in a system's design, operation, maintenance, or administration, as well as any failure or malfunction of any system component which KDHE determines to cause, or have potential to cause, an unacceptable risk to health or that could affect the reliable delivery of safe drinking water.

Requirements

Sanitary Surveys

KDHE shall conduct a sanitary survey of all public water systems which use surface water or ground water under the direct influence of surface water.

Frequency: A sanitary survey shall be conducted for non-community water supply systems every five (5) years. For community water systems, a sanitary survey shall be conducted every three (3) years.

Report: A report describing the results of the sanitary survey will be provided to the water system.

Response Required: A water system must respond in writing not later than forty-five (45) days after receipt of the sanitary survey report describing how and on what schedule the system will address significant deficiencies identified in the survey.

Violation: Failure to address significant deficiencies identified in a sanitary survey that is within the control of the public water system and its governing body shall constitute a violation of Kansas Administration Regulations.

Composite Correction Program:

KDHE may require a public water system to conduct a Composite Correction Program for the purpose of identifying and correcting deficiencies in water treatment and distribution. Failure to implement the performance improvement factors identified through the CCP constitutes a violation of Kansas Administrative Regulations.

Appendix B

Significant Deficiencies in a Sanitary Survey

List of Potentially Significant Deficiencies That May Be Noted during a Sanitary Survey

The following deficiencies have the potential to meet KDHE's definition of a significant deficiency. This list is not intended to be prescriptive. The inspector in the field will have the final word on whether or not a particular deficiency is significant. However, each of these deficiencies has the potential to be significant and referring to this list may assist the inspector in making this decision.

Source:

- * Location of intake near pollution source
- * Well construction inadequate or in deteriorated condition
- * Spring collection facilities inadequate or in deteriorated condition

Treatment:

- * The hatch to a pressure filter has not been opened on a yearly basis to clean the media and to check for media loss and the condition of the underdrain system
- * Filter does not have adequate depth of media (e.g. less than 24 inches)
- * No standard operating procedure for taking a filter out of service for backwashing, for performing the backwash, or returning the filter to service
- * No process control plan for coagulant addition
- * Inadequate application of treatment chemicals
- * Chemical feed rates not adjusted for varying raw water quality conditions or changes in plant flow rate
- * Inadequate disinfection CT
- * Unsafe chemical storage

Distribution System:

- * TCR sampling plan not representative of the distribution system
- * Negative pressures at any time
- * System not flushed periodically
- * No disinfectant residual, or HPC levels greater than 500/ml, repeatedly, at same sites
- * Inadequate monitoring of disinfectant residual, when required
- * Inadequate cross-connection controls, either at the treatment facility or in the distribution system (or failure to have a cross-connection control program)
- * Unacceptable system leakage which could result in entrance of contaminants
- * System plans unavailable or outdated
- * Valve locations unknown
- * Valves not exercised regularly or known to be inoperable

Finished Water Storage:

- * Inadequate internal cleaning and maintenance of storage tank
- * Improper venting of tank
- * Lack of proper screening of overflow pipe and drain
- * Inadequate roofing (e.g. holes in the storage tank, improper hatch construction)

Pumps, Pump Facilities and Controls:

- * Ponding of water in pump housing
- * Inadequate pump capacity
- * Lack of redundant mechanical components
- * Electrical hazards

Monitoring/Reporting/Data Verification:

- * Failure to properly monitor water quality
- * Failure of system operator to address customer complaints regarding water quality or quantity
- * TCR sampling plan not available or not being followed
- * Chronic TCR coliform detections with inadequate remediation

Water System Management/Operation:

- * Lack of properly trained or licensed staff as required by the state
- * Lack of emergency response plan
- * Failure to meet water supply demands or interruptions to service (inadequate pump capacity, unreliable water source, lack of auxiliary power)
- * Inadequate follow-up to deficiencies not in previous sanitary surveys
- * Spare parts inventory inadequate
- * Lack of accessible contact list w/phone numbers for emergency repairs or troubleshooting
- * Evidence of poor or infrequent communication between operator and system managers

Operator Compliance with State Requirements:

- * Operator does not have the correct level of certification as required by regulation



A number of national guidance products and other informational materials have been developed by EPA to assist the state and regulated water systems in complying with this rule and other related rules. Printed copies of informational materials may be requested from the Safe Drinking Water Hotline at 1-800-426-4791. Many documents may be viewed and downloaded from the following EPA Internet addresses:

<http://www.epa.gov/safewater/mdbp/mdbp.html>

<http://www.epa.gov/safewater/mdbp/implement.html>

http://www.epa.gov/safewater/mdbp/pdf/filterbackwash/fbrr_techguidance.pdf

Other national guidance products are available for this rule. The best place to access these documents as they become available is on the Internet at the web addresses provided above. Listed below are existing publications that are of general use to surface water systems.

Filter Backwash Recycling Rule, Technical Guidance Manual, EPA 816-R-02-014, December, 2002. [a.k.a. "Filter Backwash Guidance Manual"]

Guidance Manual for Conducting Sanitary Surveys of Public Water Systems: Surface Water and Ground Water Under the Direct Influence (GWUDI) of Surface Water, EPA 815-R-99-016, April 1999. [a.k.a. "Sanitary Survey Guidance Manual"]

Optimizing Water Treatment Plant Performance Using the Composite Correction Program, EPA 625/6-91/027 Revised August 1998. [a.k.a. "CCP Manual"]

Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources, US EPA, 1991. [a.k.a. "SWTR Guidance Manual"]

The following EPA Quick Reference Guide on the Interim Enhanced Surface Water Treatment Rule is provided as a handy reference as a supplement to this survival guide.



Filter Backwash Recycling Rule: A Quick Reference Guide

Overview of the Rule

Title	Filter Backwash Recycling Rule (FBRR) 66 FR 31086, June 8, 2001, Vol. 66, No. 111
Purpose	Improve public health protection by assessing and changing, where needed, recycle practices for improved contaminant control, particularly microbial contaminants.
General Description	The FBRR requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.
Utilities Covered	Applies to public water systems that use surface water or ground water under the direct influence of surface water, practice conventional or direct filtration, and recycle spent filter backwash, thickener supernatant, or liquids from dewatering processes.

Public Health Benefits

Implementation of FBRR will result in . . .	▶ Reduction in risk of illness from microbial pathogens in drinking water, particularly <i>Cryptosporidium</i> .
Estimated impacts of the FBRR include . . .	<ul style="list-style-type: none">▶ FBRR will apply to an estimated 4,650 systems serving 35 million Americans.▶ Fewer than 400 systems are expected to require capital improvements.▶ Annualized capital costs incurred by public water systems associated with recycle modifications are estimated to be \$5.8 million.▶ Mean annual cost per household is estimated to be less than \$1.70 for 99 percent of the affected households and between \$1.70 and \$100 for the remaining one percent of affected households.

Conventional and Direct Filtration

- ▶ Conventional filtration, as defined in 40 CFR 141.2, is a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal. Conventional filtration is the most common type of filtration.
- ▶ Direct filtration, as defined in 40 CFR 141.2, is a series of processes including coagulation and filtration, but excluding sedimentation, and resulting in substantial particulate removal. Typically, direct filtration can be used only with high-quality raw water that has low levels of turbidity and suspended solids.



Recycle Flows

- ▶ **Spent Filter Backwash Water** - A stream containing particles that are dislodged from filter media when water is forced back through a filter (backwashed) to clean the filter.
- ▶ **Thickener Supernatant** - A stream containing the decant from a sedimentation basin, clarifier or other unit that is used to treat water, solids, or semi-solids from the primary treatment processes.
- ▶ **Liquids From Dewatering Processes** - A stream containing liquids generated from a unit used to concentrate solids for disposal.

Critical Deadlines and Requirements

For Drinking Water Systems

December 8, 2003	Submit recycle notification to the state.
June 8, 2004	Return recycle flows through the processes of a system's existing conventional or direct filtration system or an alternate recycle location approved by the state (a 2-year extension is available for systems making capital improvements to modify recycle location). Collect recycle flow information and retain on file.
June 8, 2006	Complete all capital improvements associated with relocating recycle return location (if necessary).

For States

June 8, 2003	States submit FBRR primacy revision application to EPA (triggers interim primacy).
June 8, 2005	Primacy extension deadline - all states with an extension must submit primacy revision applications to EPA.

What does a recycle notification include?

- ▶ Plant schematic showing origin of recycle flows, how recycle flows are conveyed, and return location of recycle flows.
- ▶ Typical recycle flows (gpm), highest observed plant flow experienced in the previous year (gpm), and design flow for the treatment plant (gpm).
- ▶ State-approved plant operating capacity (if applicable).

What recycle flow information does a system need to collect and retain on file?

- ▶ Copy of recycle notification and information submitted to the state.
- ▶ List of all recycle flows and frequency with which they are returned.
- ▶ Average and maximum backwash flow rates through filters, and average and maximum duration of filter backwash process (in minutes).
- ▶ Typical filter run length and written summary of how filter run length is determined.
- ▶ Type of treatment provided for recycle flows.
- ▶ Data on the physical dimension of the equalization and/or treatment units, typical and maximum hydraulic loading rates, types of treatment chemicals used, average dose, frequency of use, and frequency at which solids are removed, if applicable.

For additional information on the FBRR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater; or contact your state drinking water representative.

Additional material is available at www.epa.gov/safewater/filterbackwash.html.